
चूर्ण धातुकर्मी अनुप्रयोगों के लिए
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(पहला पुनरीक्षण)

**Iron Powder for Powder
Metallurgical Applications**
(*First Revision*)

ICS 77.160

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

The standard was first published in 1977. In this revision following modifications have been made:

- a) Four new clauses 'References', 'Terminology', 'BIS certification marking' and 'Test certificate' have been added; and
- b) 'Marking' clause has been modified.

Iron powder is used for various applications like welding electrode coating, gas cutting, sintered bearing and structural components for various equipments.

For the purpose of deciding whether a particular requirements of this standard is complied with, the final value, observed or calculated expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

IRON POWDER FOR POWDER METALLURGICAL APPLICATIONS

(First Revision)

1 SCOPE

1.1 This standard covers the requirements for iron powder for use in the manufacture of sintered bearings and parts.

2 REFERENCES

2.1 The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of the publication, the editions indicated were valid. All the standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard.

<i>IS No.</i>	<i>Title</i>
1387 : 1993	General requirements for the supply of metallurgical materials(<i>second revision</i>)
4840 : 1984	Method for determination of flaw rate of metal powders for powder metallurgical purposes (<i>first revision</i>)
4848 : 1981	Method for determination of apparent density of free flowing powders for powder metallurgical purposes (<i>first revision</i>)
4857 : 2005/ ISO 3927 : 2001	Metallic powders excluding powders for hardmetals — Determination of compressibility in uniaxial compression (<i>fourth revision</i>)
5432 : 1982	Glossary of terms relating to powder metallurgy (<i>first revision</i>)

<i>IS No.</i>	<i>Title</i>
5461 : 1984	Method for sieve analysis of metal powders (<i>first revision</i>)
5644 (Part 2) : 1993/ ISO 4491-2 : 1989	Metallic powder : Part 2 Loss of mass on hydrogen reduction (hydrogen loss) (<i>third revision</i>)
6492 : 1972	Method for sampling of powder for powder metallurgical purposes
7438 : 1974	Method for test for acid insoluble content in iron, copper, tin and bronze powders (<i>first revision</i>)

3 TERMINOLOGY

3.1 For the purpose of this standard, the definition of terms given in IS 5432 shall apply.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of iron powder shall be as laid down in IS 1387.

5 GRADES

The material shall be of two grades, namely Grade 1 and Grade 2. The manufacturer shall specify the method of products of use in powder.

6 CHEMICAL COMPOSITION

6.1 The chemical composition of both the grades shall be as given in Table 1.

6.1.1 The methods of chemical analysis shall be as agreed to between the purchaser and the manufacturer till appropriate Indian Standards for methods of chemical analysis are formulated by BIS.

6.1.2 The hydrogen loss shall be determined in accordance with IS 5644.

Table 1 Chemical Composition
(Clause 6.1)

SI No.	Constituent	Requirement for	
		Grade 1 Percent, Max	Grade 2 Percent, Max
(1)	(2)	(3)	(4)
i)	Carbon	0.02	0.02
ii)	Sulphur	0.015	0.005
iii)	Phosphorus	0.015	0.01
iv)	Hydrogen loss	0.3	0.3
v)	Acid insolubles	0.2	0.1

6.1.3 Acid-Insoluble Content

The acid insolubles shall be determined in accordance with IS 7438.

7 SIEVE ANALYSIS

The sieve analysis of the material shall be carried out in accordance with IS 5461 and shall be as given below; for size between -45 and +150 microns the value shall be as agreed to between the purchaser and the manufacturer.

Grade 1

<i>Sieve Size Micron</i>	<i>Percent of Powder, Max</i>
+212	Nil
+180	0.5
+150	2
-45	15 to 20

Grade 2

<i>Sieve Size Micron</i>	<i>Percent of Powder, Max</i>
+212	Nil
+180	2
+150	3 to 10
-45	20 to 35

8 PHYSICAL PROPERTIES**8.1 Apparent Density**

The apparent density of different grades of material when tested in accordance with IS 4848 shall be as given below:

<i>Grade</i>	<i>Apparent Density g/cm³</i>
1	2.4 to 2.7
2	2.7 to 3.0

8.2 Flow Rate

8.2.1 The flow rate of Grades 1 and 2 material when determined in accordance with IS 4840 shall not be more than 32 s/50 g.

8.3 Compressibility

8.3.1 Unlubricated powder when pressed with a pressure of 400 N/mm² in accordance with IS 4857 shall a minimum 6.2 g/cm³, green density.

8.3.2 Powder particles should not be spherical and preferably of irregular shape.

9 SAMPLING

9.1 The sampling of powders for conducting the various tests shall be done in accordance with IS 6492.

10 PACKING

10.1 The material shall be supplied packed in suitable containers in qualities mutually agreed to between the purchaser and the manufacturer.

11 MARKING

11.1 Each container of iron powder shall be suitably marked with the following information:

- Iron powder;
- Batch number and/or date of manufacture of powder;
- Net mass of powder in the container;
- Method of manufacture of powder/type of powder; and
- Manufacturer's name and address.

12 BIS CERTIFICATION MARKING

12.1 The container of iron powder may also be marked with the Standard Mark.

12.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

13 TEST CERTIFICATE

The manufacturer shall provide the test certificate for each consignment/container giving information, such as, batch number, corresponding chemical composition, sieve analysis, apparent density, flow rate, compressibility.

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This Indian Standard has been developed from Doc No.: MTD 25 (5248).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi